INTERNATIONAL MARITIME ORGANIZATION

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Agenda items 5 and 9

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DEVELOPMENT OF GUIDELINES AND OTHER DOCUMENTS FOR UNIFORM IMPLEMENTATION OF THE 2004 BWM CONVENTION, AND DEVELOPMENT OF INTERNATIONAL MEASURES FOR MINIMIZING THE TRANSFER OF INVASIVE AQUATIC SPECIES THROUGH BIOFOULING OF SHIPS

Report of the working group

General

1 The Working Group on the development of guidelines and other documents for uniform implementation of the 2004 BWM Convention and international measures for minimizing the transfer of invasive aquatic species through biofouling of ships (Ballast Water and Biofouling Working Group) met from 7 to 9 February 2011 under the co-chairmanship of Mr. Chris Wiley (Canada) and Dr. Naomi Parker (New Zealand).

2 The meeting was attended by delegations from the following Member Governments:

AUSTRALIA
BAHAMAS
BELGIUM
BRAZIL
CANADA
CHINA
DENMARK
FINLAND
FRANCE
GERMANY
JAPAN
LIBERIA
MALAYSIA
MARSHALL ISLANDS
NETHERLANDS
NEW ZEALAND
NIGERIA
NORWAY
PANAMA
POLAND
REPUBLIC OF KOREA
SAUDI ARABIA
SINGAPORE
SPAIN
SWEDEN
UNITED KINGDOM
UNITED STATES

by an IMO Associate Member:

HONG KONG, CHINA

by an observer from the following intergovernmental organization:

EUROPEAN COMMISSION (EC)

and by observers from the following non-governmental organizations:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)
EUROPEAN CHEMICAL INDUSTRY COUNCIL (CEFIC)
COMMUNITY OF EUROPEAN SHIPYARDS' ASSOCIATION (CESA)
INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE (IUCN)
INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)
CRUISE LINES INTERNATIONAL ASSOCIATION (CLIA)
INSTITUTE OF MARINE ENGINEERING, SCIENCE AND TECHNOLOGY (IMarEST)
INTERNATIONAL SAILING FEDERATION (ISAF)
INTERNATIONAL PAINT AND PRINTING INK COUNCIL (IPPIC)
NACE INTERNATIONAL

Terms of Reference

3 Taking into account the comments made and decisions taken in plenary, the working group was instructed to:

.1 develop a BWM circular to provide ballast water sampling and analysis protocols and to give advice on the uniform application of these protocols, using the text contained in the annex to documents BLG 15/5/1, BLG 15/5/4, BLG 15/5/5 and BLG 15/5/6 as a starting point, taking into account the information and comments contained in documents BLG 15/5/8, BLG 15/5/9, BLG 15/5/10, BLG 15/INF.4, BLG 14/5/2 and BLG 15/INF.6;

.2 finalize the "Procedure for approving other methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention", using document BLG 15/5 as a base document, taking into account the proposal made in document BLG 15/5/7;

.3 consider document BLG 15/5/2 with the view to developing a BWM circular on "Scaling of ballast water management systems", which could be updated periodically to reflect the progress in science and engineering;

.4 finalize, as a matter of priority, the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species together with the draft MEPC resolution for their adoption, using annex 1 and annex 4 to document BLG 15/9 as the basis, taking into consideration the recommendations contained in document BLG 15/9/1;

.5 if time permits, consider the options for providing guidance to the recreational sector on managing biofouling summarized in paragraph 14 of the report of the correspondence group (BLG 15/9), and finalize the draft Guidelines/guidance document for recreational craft less than 24 metres in length using annex 2 and/or annex 3 to document BLG 15/9 as a basis;

.6 consider the draft time frame, criteria and process for evaluating the effectiveness of the Guidelines, using annex 5 to document BLG 15/9 as a base document;

.7 consider the need for the development of a guidance document on disposal of biofouling waste in land-based facilities and advise the Sub-Committee accordingly; and

.8 submit a written report by Thursday, 10 February 2011, which should include recommendations to MEPC 62.

DEVELOPMENT OF INTERNATIONAL MEASURES FOR MINIMIZING THE TRANSFER OF INVASIVE AQUATIC SPECIES THROUGH BIOFOULING OF SHIPS

Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (the Biofouling Guidelines)

4 As instructed by the Sub-Committee, the Group considered documents BLG 15/9 (New Zealand) and BLG 15/9/1 (Japan) in further developing the draft Biofouling Guidelines.

5 Having noted that the word "biofouling" has been used both with and without a hyphen, the Group agreed that since biofouling is a common term in the scientific literature and its common usage is without a hyphen, it should be used without the hyphen in the Guidelines.

6 Having agreed to consider the text contained in annex 1 to document BLG 15/9 section by section, and where required, paragraph by paragraph, the Group reviewed the draft Guidelines and made a number of amendments mainly of an editorial nature.

7 The Group discussed the proposals to simplify the definitions of macrofouling and microfouling proposed by Japan in document BLG 15/9/1 and agreed to a simpler definition of microfouling that would be clearer to the shipping industry. The Group also considered whether to include in the Guidelines a target for the capture of material released during in-water cleaning. After some discussion the Group agreed that rather than including a specific size target, the Guidelines should recommend that in-water cleaning technologies should be used that minimize the release of both anti-fouling coating and paint debris, and viable adult, juvenile, or reproductive stages of macrofouling organisms.

8 Having completed the review of the draft text, the Group agreed to request the Sub-Committee to invite MEPC 62 to adopt the "Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species" contained in annex 1 of this report through an MEPC resolution.

9 The Group spent considerable time discussing the three options for providing guidance for recreational craft and agreed that all ships should be included within the scope of the Guidelines (annex 1) and that a separate guidance document that provides advice for owners and/or operators of recreational craft less than 24 metres in length should be developed based on annex 3 to document BLG 15 /9 that would contain all the information relevant to them. In the time available the Group was unable to finalize the guidance document for recreational craft and agreed to continue this work at BLG 16. The Group noted the intention of the delegation of Australia to provide an updated document for recreational craft and encouraged other interested parties to contribute to and co-sponsor such a document.

10 The Group briefly discussed the time frame, criteria and process for evaluating the effectiveness of the Guidelines. The Group noted the need for the evaluation process to cover both the dissemination and use of the Guidelines, and their effectiveness in reducing biofouling on ships. The Group was of the view that the proposed annual review may not provide sufficient information, particularly after the first year, and agreed to consider the dry-docking schedules when setting the time frame for review. The Group agreed that Administrations should be encourged to report on how effective Administrations were in disseminating the Guidelines and any research looking at effectiveness of the Guidelines and

concluded that further work was required to finalize this document at BLG 16. In this respect, the Group noted the intention of the delegation of New Zealand to provide an updated document on evaluation of the Guidelines and encouraged other interested parties to contribute to and co-sponsor such a document.

11 In the time available, the Group was unable to consider the term of reference relating to the potential need for guidance on the disposal of in-water cleaning material to land-based facilities. The Group agreed to continue this work at BLG 16 and also noted that such potential guidance should not be limited to land-based disposal and should also consider potential links to MARPOL Annex V and/or the London Convention and Protocol.

12 In light of the considerable work to be finalized by the target completion date of 2012 the Group agreed to request the Sub-Committee to re-establish the working group at BLG 16 with the terms of reference outlined in annex 4.

DEVELOPMENT OF GUIDELINES AND OTHER DOCUMENTS FOR UNIFORM IMPLEMENTATION OF THE 2004 BWM CONVENTION

13 Considering the time constraints imposed by the number of documents, the time allocated to the biofouling issues and the Terms of Reference provided by the Sub-Committee, the Group agreed on a number of working arrangements to prioritize its objectives and make the best use of the time available. The Group agreed further that although the highest priority was to develop the circular on ballast water sampling and analysis protocols, it was not realistic to aim at completing the work at this session and that further intersessional work was needed in order to complete this task at BLG 16.

14 Having recognized that the draft Procedure for approving Other Methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention, contained in document BLG 15/5 (Australia *et al*.) is in its final stage of development, and that if finalized at this session could be submitted for adoption by MEPC 62, the Group agreed to first complete the work on this document.

15 At the request of Norway and Germany, the Group then reviewed document BLG 15/5/2 as it was believed that gaps with respect to scaling in Guidelines (G8) were negatively affecting the current Type Approval process worldwide and the document was short. In the time remaining, the Group concentrated on the development of the circular on ballast water sampling and analysis protocols.

16 Time permitting, the Group agreed to consider document BLG 15/5/7 (Canada) and advise the Sub-Committee accordingly.

Procedure for approving Other Methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention (Other Methods for BWM)

17 As instructed by the Sub-Committee, the Group used the annex of document BLG 15/5 (Australia *et al.*) as a basis for the development of the Procedure for approving other methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention.

18 The Group had extensive discussions on the urgency of developing such a Procedure, the anticipated methods for ballast water management which might be considered under it, the purpose and applicability of its provisions and agreed on a number of amendments, mainly of an editorial nature.

19 After completing the paragraph-by-paragraph review of the draft text, the Group agreed on the final version of the Procedure for approving Other Methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention, contained in annex 2 to this report, and agreed to request the Sub-Committee to instruct the Secretariat to prepare the associated draft MEPC resolution and to invite MEPC 62 to adopt the Procedure.

20 In the time available the Group was not able to consider document BLG 15/5/7 (Canada) and agreed to refer this document to BLG 16.

Scaling of ballast water management systems

21 In considering document BLG 15/5/2 (Germany and Norway) the Group identified significant redundancy in the text of the document as compared with the provisions of Guidelines (G8). The redundant text together with the appendices relating to the ballast water management systems using UV and filtration were removed. Additionally, reference to scaling of systems using units in parallel was also deleted.

22 The Group agreed on the significantly reduced version of this guidance document and requested the Sub-Committee to invite MEPC 62 to approve it for dissemination as a BWM circular.

Development of a technical circular on ballast water sampling and analysis protocols

23 The Group acknowledged the close relationship between the technical circular and the Guidelines on port State control inspections for compliance with the BWM Convention, currently under consideration by the FSI Sub-Committee. In this respect and after considerable discussions, the Group agreed to organize its work by first addressing the development of the circular on ballast water sampling and analysis protocols, then focusing on the identification of gaps in current research regarding methods for sampling and analysis and lastly on addressing the operational issues involved in sampling with regard to port State control.

24 As instructed by the Sub-Committee, the Group used documents BLG 15/5/1, BLG 15/5/4, BLG 15/5/5 and BLG 15/5/6 by Austria *et al.* as a basis for discussion taking also into consideration documents BLG 15/5/8 (ICES), BLG 15/5/9, BLG 15/5/10 (United States), BLG 15/INF.4, BLG 14/5/2 (Brazil) and BLG 15/INF.6 (United States). The proposals contained in document BLG 14/5/2 was updated and put in accordance with BLG 15/INF.4 recommendations.

25 After extensive discussions on principles the Group agreed to summarize the existing information on methods for sampling and analysis in a tabular format to facilitate further development of a circular and to help identify possible gaps. During further discussions, the proposed table was expanded to include information on the degree of confidence, sampling volumes, definitions and approaches to sampling and analysis.

26 The Group had considerable discussions on the meaning of the terms "indicative" and "representative" analysis and sampling with respect to the circular and whether onboard monitoring of the ballast water management systems could be included.

27 The Group agreed to combine some of the narrative text contained in the Austria *et al*. documents, which was found to be explanatory, with the information contained in the expanded table as a way forward to develop a comprehensive circular. Although the Group made significant progress in addressing the various aspects related to sampling and analysis in the time available, the Group was not able to finalize the circular and agreed on a work plan to facilitate its completion at BLG 16.

28 To ensure that the technical circular on ballast water sampling and analysis protocols is finalized by the BLG Sub-Committee and approved by the MEPC, before the anticipated entry into force of the BWM Convention, the Group agreed that it would be essential to request the Sub-Committee to establish a correspondence group under the coordination of the European Commission[1] with the following terms of reference:

.1 finalize the circular on ballast water sampling and analysis using the documents submitted at this session, the *aide-memoire* contained in document BLG 13/18, annex 6, BLG 14/INF.6 and the guidance contained in paragraphs 23 to 27 of document BLG 15/WP.4;

.2 identify and compile the operational issues involved in sampling with regard to port State control contained in documents BLG 15/5/1, BLG 15/5/4, BLG 15/5/5 and BLG 15/5/6 to facilitate the implementation of the BWM Convention; and

.3 submit a written report to BLG 16.

29 The Group further agreed to request the Sub-Committee to invite MEPC 62 to note that it is anticipated that the Circular on ballast water sampling and analysis will be finalized at BLG 16 and to agree, in accordance with paragraph 4.9 of MSC-MEPC.1/Circ.2, to consider this circular at MEPC 63 as an urgent matter emanating from a subsidiary body.

30 Having acknowledged that technologies and expertise regarding ballast water management are constantly increasing, the Group requested the Sub-Committee to urge Members and observers to submit future contributions on new methodologies with regard to ballast water sampling and analysis to assess compliance with the BWM Convention to BLG 16 taking into consideration the *aide-memoire* developed by BLG 13.

Future work

31 In light of the remaining work and in anticipation of the entry into force of the BWM Convention, the Group agreed to request the Sub-Committee to re-establish the Working Group at BLG 16 with the provisional Terms of Reference as provided in annex 4 to this report.

32 The Group noted that Roger Lankester of FOEI, who had been a member of the working group for many years would no longer attend the meetings and acknowledged his significant input to ballast water and biofouling issues over more than 20 years.

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Action requested of the Sub-Committee

33 The Sub-Committee is requested to approve the report in general and in particular to:

.1 invite MEPC 62 to adopt the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species as set out in annex 1 by an MEPC resolution (paragraph 9, annex 1);

.2 invite MEPC 62 to adopt the Procedure for approving Other Methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention, as set out in annex 2 to this report and instruct the Secretariat to prepare the associated draft MEPC resolution (paragraph 19, annex 2);

.3 invite MEPC 62 to approve the Guidance document on scaling of ballast water management systems as set out in annex 3 and to instruct the Secretariat to issue a BWM circular on this matter (paragraph 22, annex 3);

.4 note the progress made in the development of the Circular on ballast water sampling and analysis (paragraphs 23 to 27);

.5 establish a correspondence group under the coordination of the European Commission with the terms of reference contained in paragraph 28 of this report;

.6 invite MEPC 62 to note that it is anticipated that the Circular on ballast water sampling and analysis will be finalized at BLG 16 and to agree, in accordance with paragraph 4.9 of MSC-MEPC.1/Circ.2, to consider this circular at MEPC 63 as an urgent matter emanating from a subsidiary body (paragraph 29);

.7 urge Members and observers to submit future contributions on new methodologies with regard to ballast water sampling and analysis to BLG 16 taking into consideration the *aide-memoire* developed by BLG 13 (paragraph 30); and

.8 re-establish the Ballast Water and Biofouling Working Group at BLG 16 with the provisional terms of reference contained in annex 4 to this report (paragraph 31, annex 4).

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ANNEX 1

DRAFT MEPC RESOLUTION

GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS' BIOFOULING TO MINIMIZE THE TRANSFER OF INVASIVE AQUATIC SPECIES

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38 of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee relating to any matter within the scope of the Organization concerned with the prevention and control of marine pollution from ships,

RECALLING ALSO that Member States of the International Maritime Organization made a clear commitment to minimizing the transfer of invasive aquatic species by shipping in adopting the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004,

RECALLING FURTHER that studies have shown biofouling on ships to be an important means of transferring invasive aquatic species, which if established in new ecosystems, may pose threats to the environment, human health, property and resources,

NOTING the objectives of the Convention on Biological Diversity, 1992, and that the transfer and introduction of aquatic invasive species through ships' biofouling threatens the conservation and sustainable use of biological diversity,

NOTING ALSO that implementing practices to control and manage ships' biofouling can greatly assist in reducing the risk of the transfer of invasive aquatic species,

NOTING FURTHER that this issue, being of worldwide concern, demands a globally consistent approach to the management of biofouling,

HAVING CONSIDERED, at its sixty-second session, the draft Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species, developed by the Sub-Committee on Bulk Liquids and Gases,

1. ADOPTS the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species set out in the annex to the present resolution;

2. REQUESTS Member States to take urgent action in applying these Guidelines, including; the dissemination thereof to the shipping industry and other interested parties, taking these Guidelines into account when adopting measures to minimize the risk of introducing invasive aquatic species via biofouling, and reporting to the MEPC on any experience gained in their implementation;

3. AGREES to keep these Guidelines under review in light of the experience gained.

* * *

ANNEX

DRAFT GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS' BIOFOULING TO MINIMIZE THE TRANSFER OF INVASIVE AQUATIC SPECIES

TABLE OF CONTENTS

1 INTRODUCTION

1.1 In the adoption of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention), Member States of the International Maritime Organization (IMO) made a clear commitment to minimizing the transfer of invasive aquatic species by shipping. Studies have shown that biofouling can also be a significant vector for the transfer of invasive aquatic species. Biofouling on ships entering the waters of States may result in the establishment of invasive aquatic species which may pose threats to human, animal and plant life, economic and cultural activities and the aquatic environment.

1.2 While the International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001 (AFS Convention) addresses anti-fouling systems on ships, its focus is on the prevention of adverse impacts from the use of anti-fouling systems and the biocides they may contain, rather than preventing the transfer of invasive aquatic species.

1.3 The potential for invasive aquatic species transferred through biofouling to cause harm has been recognized by the IMO, the Convention on Biological Diversity (CBD), several UNEP Regional Seas Conventions (e.g., Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution), the Asia Pacific Economic Cooperation forum (APEC), and the Secretariat of the Pacific Region Environmental Program (SPREP).

1.4 All ships have some degree of biofouling, even those which may have been recently cleaned or had a new application of an anti-fouling coating system. Studies have shown that the biofouling process begins within the first few hours of a ship's immersion in water. The biofouling that may be found on a ship is influenced by a range of factors, such as follows:

.1 design and construction, particularly the number, location and design of niche areas;

.2 specific operating profile, including factors such as operating speeds, ratio of time underway compared with time alongside, moored or at anchor, and where the ship is located when not in use (e.g., open anchorage or estuarine port);

.3 places visited and trading routes; and

.4 maintenance history, including: the type, age and condition of any anti-fouling coating system, installation and operation of anti-fouling systems and dry-docking/slipping and hull cleaning practices.

1.5 Implementing practices to control and manage biofouling can greatly assist in reducing the risk of the transfer of invasive aquatic species. Such management practices can also improve a ship's hydrodynamic performance and can be effective tools in enhancing energy efficiency and reducing air emissions from ships. This concept has been identified by the IMO in the "Guidance for the development of a ship energy efficiency management plan (SEEMP)" (MEPC.1/Circ.683).

1.6 These Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (hereafter "the Guidelines") are intended to provide a globally consistent approach to the management of biofouling. As scientific and technological advances are made, the Guidelines will be refined to enable the risk to be more adequately addressed. Port States, flag States, coastal States and other parties that can assist in mitigating the problems associated with biofouling should exercise due diligence to implement the Guidelines to the maximum extent possible.

2 DEFINITIONS

2.1 For the purposes of these Guidelines, the following definitions apply:

AFS Convention means the International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001.

Anti-fouling coating system means the combination of all component coatings, surface treatments (including primer, sealer, binder, anti-corrosive and anti-fouling coatings) or other surface treatments, used on a ship to control or prevent attachment of unwanted aquatic organisms.

Anti-fouling system means a coating, paint, surface treatment, surface, or device that is used on a ship to control or prevent attachment of unwanted organisms.

Biofouling means the accumulation of aquatic organisms such as micro-organisms, plants, and animals on surfaces and structures immersed in or exposed to the aquatic environment. Biofouling can include microfouling and macrofouling (see below).

In-water cleaning means the physical removal of biofouling from a ship while in the water.

Invasive aquatic species means a species which may pose threats to human, animal and plant life, economic and cultural activities and the aquatic environment.

Marine Growth Prevention System (MGPS) means an anti-fouling system used for the prevention of biofouling accumulation in internal seawater cooling systems and sea chests and can include the use of anodes, injection systems and electrolysis.

Member States means States that are Members of the International Maritime Organization.

Macrofouling means large, distinct multicellular organisms visible to the human eye such as barnacles, tubeworms, or fronds of algae.

Microfouling means microscopic organisms including bacteria and diatoms and the slimy substances that they produce. Biofouling comprised of only microfouling is commonly referred to as a slime layer.

Niche areas mean areas on a ship that may be more susceptible to biofouling due to different hydrodynamic forces, susceptibility to coating system wear or damage, or being inadequately, or not, painted, e.g., sea chests, bow thrusters, propeller shafts, inlet gratings, dry-dock support strips, etc.

Organization means the International Maritime Organization.

Port State authority means any official or organization authorized by the Government of a port State to verify the compliance and enforcement of standards and regulations relevant to the implementation of national and international shipping control measures.

Ship means a vessel of any type whatsoever operating in the aquatic environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft, fixed or floating platforms, floating storage units (FSUs) and floating production storage and off-loading units (FPSOs).

States means coastal, port or Member States as appropriate.

Treatment means a process which may use a mechanical, physical, chemical or biological method to remove or render sterile, invasive or potentially invasive aquatic species fouling a ship.

3 APPLICATION

3.1 The Guidelines are intended to provide useful recommendations on general measures to minimize the risks associated with biofouling for all types of ships and are directed to States, shipmasters, operators and owners, shipbuilders, ship cleaning and maintenance operators, port authorities, ship repair, dry-docking and recycling facilities, ship designers, classification societies, anti-fouling paint manufacturers and suppliers and any other interested parties. A State should determine the extent that the Guidelines are applied within that particular State.

3.2 A separate guidance document, based on these Guidelines, provides advice relevant to owners and/or operators of recreational craft less than 24 metres in length, using terminology appropriate for that sector.

3.3 States should inform the Organization of any relevant biofouling regulations, management requirements or restrictions they are applying to international shipping.

4 OBJECTIVES

4.1 The objectives of these Guidelines are to provide practical guidance to States, ship masters, operators and owners, shipbuilders, ship repair, dry-docking and recycling facilities, ship cleaning and maintenance operators, ship designers, classification societies, anti-fouling paint manufacturers and suppliers and any other interested parties, on measures to minimize the risk of transferring invasive aquatic species from ships' biofouling. It is important that biofouling management procedures be effective as well as environmentally safe, practical, designed to minimize costs and delays to the ship, and based upon these Guidelines whenever possible.

4.2 To minimize the transfer of invasive aquatic species, a ship should implement biofouling management practices, including the use of anti-fouling systems and other operational management practices to reduce the development of biofouling. The intent of such practices is to keep the ship's submerged surfaces, and internal seawater cooling systems, as free of biofouling as practical. A ship following this guidance and minimizing macrofouling would have a reduced potential for transferring invasive aquatic species via biofouling.

4.3 The management measures outlined within these Guidelines are intended to complement current maintenance practices carried out within the industry.

5 BIOFOULING MANAGEMENT PLAN AND RECORD BOOK

5.1 Implementation of an effective biofouling management regime is critical for minimizing the transfer of invasive aquatic species. The biofouling management measures to be undertaken on a ship should be outlined in a biofouling management plan, and records of biofouling management practices kept in a biofouling record book, as outlined below.

Biofouling Management Plan

5.2 It is recommended that every ship should have a biofouling management plan. The intent of the plan should be to provide effective procedures for biofouling management. An example of a Biofouling Management Plan is outlined in appendix 1 of these Guidelines. The Biofouling Management Plan may be a stand-alone document, or integrated in part or fully, into the existing ships' operational and procedural manuals and/or planned maintenance system.

5.3 The biofouling management plan should be specific to each ship and included in the ship's operational documentation. Such a plan should address, among other things, the following:

.1 relevant parts of these Guidelines;

.2 details of the anti-fouling systems and operational practices or treatments used, including those for niche areas;

.3 hull locations susceptible to biofouling, schedule of planned inspections, repairs, maintenance and renewal of anti-fouling systems;

.4 details of the recommended operating conditions suitable for the chosen anti-fouling systems and operational practices;

.5 details relevant for the safety of the crew, including details on the anti-fouling system(s) used; and

.6 details of the documentation required to verify any treatments recorded in the Biofouling Record Book as outlined in appendix 2.

5.4 The biofouling management plan should be updated as necessary.

Biofouling Record Book

5.5 It is recommended that a Biofouling Record Book is maintained for each ship. The book should record details of all inspections and biofouling management measures undertaken on the ship. This is to assist the shipowner and operator to evaluate the efficacy of the specific anti-fouling systems and operational practices on the ship in particular, and of the biofouling management plan in general. The record book could also assist interested State authorities to quickly and efficiently assess the potential biofouling risk of the ship, and thus minimize delays to ship operations. The Biofouling Record Book may be a stand-alone document, or integrated in part, or fully, into the existing ships' operational and procedural manuals and/or planned maintenance system.

5.6 It is recommended that the Biofouling Record Book be retained on the ship for the life of the ship.

5.7 Information that should be recorded in a Biofouling Record Book includes the following:

.1 details of the anti-fouling systems and operational practices used (where appropriate as recorded in the Anti-fouling System Certificate), where and when installed, areas of the ship coated, its maintenance and, where applicable, its operation;

.2 dates and location of dry-dockings/slippings, including the date the ship was re-floated, and any measures taken to remove biofouling or to renew or repair the anti-fouling system;

.3 the date and location of in-water inspections, the results of that inspection and any corrective action taken to deal with observed biofouling;

.4 the dates and details of inspection and maintenance of internal seawater cooling systems, the results of these inspections, and any corrective action taken to deal with observed biofouling and any reported blockages; and

.5 details of when the ship has been operating outside its normal operating profile including any details of when the ship was laid-up or inactive for extended periods of time.

5.8 An example of a Biofouling Record Book and information to be recorded is included as appendix 2 to these Guidelines.

6 ANTI-FOULING SYSTEM INSTALLATION AND MAINTENANCE

6.1 Anti-fouling systems and operational practices are the primary means of biofouling prevention and control for existing ships' submerged surfaces, including the hull and niche areas. An anti-fouling system can be a coating system applied to exposed surfaces, biofouling resistant materials used for piping and other unpainted components, marine growth prevention systems (MGPSs) for sea chests and internal seawater cooling systems, or other innovative measures to control biofouling.

6.2 The anti-fouling system used should comply with the AFS Convention, where necessary.

Choosing the anti-fouling system

6.3 Different anti-fouling systems are designed for different ship operating profiles so it is essential that ship operators, designers and builders obtain appropriate technical advice to ensure an appropriate system is applied or installed. If an appropriate anti-fouling system is not applied, biofouling accumulation increases.

6.4 Some factors to consider when choosing an anti-fouling system include the following:

.1 planned periods between dry-docking – including any mandatory requirements for ships survey;

.2 ship speed – different anti-fouling systems are designed to optimize anti-fouling performance for specific ship speeds;

.3 operating profile – patterns of use, trade routes and activity levels, including periods of inactivity, influence the rate of biofouling accumulation;

.4 ship type and construction; and

.5 any legal requirements for the sale and use of the anti-fouling systems.

6.5 Consideration should also be given to the need for tailored, differential installation of anti-fouling coating systems for different areas of the ship to match the required performance and longevity of the coating with the expected wear, abrasion and water flow rates in specific areas, such as the bow, rudder, or internal seawater cooling systems and sea chest interiors.

Installing, re-installing, or repairing the anti-fouling system

6.6 Whether installing, re-installing or repairing the anti-fouling system, care should be taken in surface preparation to ensure all biofouling residues, flaking paint, or other surface contamination is completely removed, particularly in niche areas, to facilitate good adhesion and durability of the anti-fouling system.

6.7 For sea chests the following should be considered when installing, re-installing, or repairing their anti-fouling systems:

.1 inlet grates and the internal surfaces of sea chests should be protected by an anti-fouling coating system that is suitable for the flow conditions of seawater over the grate and through the sea chest;

.2 care should be taken in surface preparation and application of any anti-fouling coating system to ensure adequate adhesion and coating thickness. Particular attention should be paid to the corners and edges of sea chests, blowout pipes, holding brackets and the bars of grates. Grates may require a major refurbishment type of surface preparation at each dry-docking to ensure coating durability; and

.3 the installation of MGPSs is encouraged to assist in treating the sea chest and internal seawater piping as part of the biofouling management plan. A careful evaluation of the consequential effects of MGPSs should be made before installation, including potential effects on the ship and/or the environment and the existence of regulations affecting the use of MGPSs.

6.8 Other niche areas can also be particularly susceptible to biofouling growth. Management measures for niche areas are outlined below.

.1 **Dry-docking support strips** – Positions of dry-docking blocks and supports should be varied at each dry-docking, or alternative arrangements made to ensure that areas under blocks are painted with anti-fouling, at least at alternate dry-dockings. These areas should receive a major refurbishment type of surface preparation and be coated at each dry-docking that they are accessible. Where it is not possible to alternate the position of dry-docking support strips, e.g., in critical weight bearing areas such as under the engine-room, these areas should be specially considered and managed by other means, e.g., the application of specialized coatings or procedures.

.2 **Bow and stern thrusters** – The body and area around bow, stern and any other thrusters prone to coating damage, should be routinely maintained at dry-dockings. Particular attention should be paid to any free flooding spaces which may exist around the thruster tunnel. The housings/recesses, and retractable fittings such as stabilizers and thruster bodies, should have an anti-fouling coating system of adequate thickness for optimal effectiveness.

.3 **Edges and weld joints** – Exposed edges on the hull, such as around bilge keels and scoops, and weld joints, should be faired and coated to ensure adequate coating thickness to optimize system effectiveness.

.4 **Rudder hinges and stabilizer fin apertures** – Recesses within rudder hinges and behind stabilizer fins need to be carefully and effectively cleaned and re-coated at maintenance dry-dockings. Rudders and stabilizer fins should be moved through their full range of motion during the coating process to ensure that all surfaces are correctly coated to the specification of the anti-fouling system. Rudders, rudder fittings and the hull areas around them should also be adequately coated to withstand the increased wear rates experienced in these areas.

.5 **Propeller and shaft** – Propellers and immersed propeller shafts should be coated with fouling release coatings where possible and appropriate, to maintain efficiency and enable self-cleaning, so that the need for regular in-water cleaning and polishing is minimized.

.6 **Stern tube seal assemblies and the internal surfaces of rope guards** – Exposed sections of stern tube seal assemblies and the internal surfaces of rope guards should be carefully painted with anti-fouling coating systems appropriate to the degree of water movement over and around these surfaces.

.7 **Cathodic protection (CP) anodes** – Niche areas for biofouling can be minimized if: anodes are flush-fitted to the hull; a rubber backing pad is inserted between the anode and the hull; or the gap is caulked. Caulking the gap will make the seam or joint watertight. If not flush-fitted, the hull surface under the anode and the anode strap should be coated with an anti-fouling coating system suitable for low water flow to prevent biofouling accumulation. If anodes are attached by bolts recessed into the anode surface, the recess should be caulked to remove a potential niche.

.8 **Pitot tubes** – Where retractable pitot tubes are fitted, the housing should be internally coated with an anti-fouling coating system suitable for static conditions.

.9 **Sea inlet pipes and overboard discharges** – Anti-fouling coating systems should be applied inside the pipe opening and accessible internal areas. The anti-corrosive or primer coating selected should be appropriate to the specific pipe material if this material is different to the hull. Care should be taken in surface preparation and coating application to ensure good adhesion and coating thickness.

Procedures for ship maintenance and recycling facilities

6.9 Ship maintenance and recycling facilities should adopt measures (consistent with applicable national and local laws and regulations) to ensure that viable biofouling organisms or chemical and physical pollutants are not released into the local aquatic environment. These measures include the following:

.1 capturing biological material to minimize the risk of organism survival and establishment and other impacts of biological material being released into the aquatic environment;

.2 treating and/or disposing of captured biological material in an environmentally appropriate manner;

.3 scheduling of ships' arrival and departure at cleaning and maintenance facilities and at locations where ships are moored while waiting for cleaning and maintenance to minimize the risk of fouled ships contaminating other ships and the surrounding environment;

.4 removing biofouling from all underwater surfaces of a ship when in dry-dock, including niche areas; and

.5 lowering or extending retractable equipment such as stabilizers, thrusters, transducers and similar when a ship is in dry-dock or slipped, to permit access for the removal of biofouling from the equipment and its housing.

7 IN-WATER INSPECTION, CLEANING AND MAINTENANCE

7.1 Despite the use of effective anti-fouling systems and operational practices, undesirable amounts of biofouling may still accumulate during the intended lifetime of the anti-fouling system. To maintain a ship as free of biofouling as practical, it may be advisable for the ship to undertake in-water inspection, cleaning and maintenance.

In-water inspection of ships

7.2 In-water inspection can be a useful and flexible means to inspect the condition of anti-fouling systems and the biofouling status of a ship. In-water inspections should be undertaken periodically as a general means of routine surveillance, augmented by specific inspections as necessary to address any situations of elevated risk. Specific occasions when an in-water inspection may be appropriate, include the following:

.1 before and after any planned period of inactivity or significant or unforeseen change to the ship's operating profile;

.2 prior to undertaking in-water cleaning to determine the presence of known or suspected invasive aquatic species or other species of concern on the ship;

.3 after a known or suspected marine pest or other species of concern is discovered in a ship's internal seawater cooling systems; and

.4 following damage to, or premature failure of, the anti-fouling system.

7.3 It is recommended that ship operators identify niche areas on the ship that may accumulate biofouling to enable these areas to be effectively targeted during inspections. Areas may include the following:

- propeller thrusters and propulsion units;
- sea chests;
- rudder stock and hinge;
- stabilizer fin apertures;
- rope guards, stern tube seals and propeller shafts;

- cathodic protection anodes;
- anchor chain and chain lockers;
- free flood spaces inherent to the ships' design;
- sea chest and thruster tunnel grates;
- echo sounders and velocity probes;
- overboard discharge outlets and sea inlets; and
- areas prone to anti-fouling coating system damage or grounding (e.g., areas of the hull damaged by fenders when alongside, leading edges of bilge keels and propeller shaft "y" frames).

7.4 Dive and remotely operated vehicle (ROV) surveys can be practical options for in-water inspections although they do have limitations regarding visibility and available dive time compared with the area to be inspected, and difficulties with effectively accessing many biofouling prone niches. Such surveys should be undertaken by persons who are suitably qualified and experienced and familiar with biofouling and associated invasive aquatic species risks and the safety risks relating to in-water surveys. Regulatory authorities may have recommended or accredited biofouling inspection divers.

In-water cleaning and maintenance

7.5 In-water cleaning can be an important part of biofouling management. In-water cleaning can also introduce different degrees of environmental risk, depending on the nature of biofouling (i.e. microfouling versus macrofouling), the amount of anti-fouling coating system residue released and the biocidal content of the anti-fouling coating system. Relative to macrofouling, microfouling can be removed with gentler techniques that minimize degradation of the anti-fouling coating system and/or biocide release. Microfouling removal may enhance a ship's hull efficiency, reducing fuel consumption and greenhouse gas emissions. It is therefore recommended that the ship's hull is cleaned when practical by soft methods if significant microfouling occurs. In-water cleaning can also reduce the risk of spreading invasive aquatic species by preventing macrofouling accumulation.

7.6 It may be appropriate for States to conduct a risk assessment to evaluate the risk of in-water cleaning activities and minimize potential threats to their environment, property and resources. Risk assessment factors could include the following:

.1 biological risk of the biofouling organisms being removed from the ship (including viability of the biofouling organisms or the ability to capture biofouling material);

.2 factors that may influence biofouling accumulation, such as changes to the operating profile of the ship;

.3 geographical area that was the source of the biofouling on the ship, if known; and

.4 toxic effects related to substances within the anti-fouling coating system that could be released during the cleaning activity, and any subsequent damage to the anti-fouling coating system.

7.7 Personnel proposing to undertake in-water cleaning should be aware of any regulations or requirements for the conduct of in-water cleaning, including any regulations regarding the discharge of chemicals into the marine environment and the location of sensitive areas (such as marine protected areas and ballast water exchange areas). Where significant macrofouling growth is detected, it should be removed or treated (if this can be done without damaging the anti-fouling system) in accordance with such regulations. Where available, appropriate technology should be used to minimize the release of both anti-fouling coating or paint debris, and viable adult, juvenile, or reproductive stages of macrofouling organisms. The collected material should be disposed of in a manner which does not pose a risk to the aquatic environment.

7.8 For immersed areas coated with biocidal anti-fouling coatings, cleaning techniques should be used that minimize release of biocide into the environment. Cleaning heavily fouled anti-fouling coating systems can not only generate biofouling debris, but prematurely depletes the anti-fouling coating system and may create a pulse of biocide that can harm the local environment and may impact on future applications by the port authority for the disposal of dredge spoil. Depleted anti-fouling coating systems on hulls will rapidly re-foul. In-water cleaning or scrubbing of hulls for the purpose of delaying dry-dockings beyond the specified service life of the coating is therefore not recommended.

7.9 Immersed areas coated with biocide-free anti-fouling coating systems may require regular in-water cleaning as part of planned maintenance to maintain hull efficiency and minimize the risk of transferring invasive aquatic species. Cleaning techniques should be used which do not damage the coating and impair its function.

7.10 Any maintenance or repair activities should take care not to impede future in-service cleaning and/or maintenance, e.g., care should be taken to ensure sea chest grates do not become welded shut during repair work.

7.11 Care should be taken to ensure that any MGPSs installed are operating effectively to prevent accumulation of biofouling.

7.12 Regular polishing of uncoated propellers to maintain operational efficiency will also minimize macrofouling accumulation. Uncoated propeller shafts may require cleaning at the same time as the propeller. As a ship's routine propeller polishing will involve the use of divers, it is recommended that this opportunity is taken to assess sea chests, and other similar areas, for macrofouling.

7.13 Internal seawater cooling systems need to be regularly monitored to ensure effective biofouling control is maintained. Seawater cooling systems that operate while the ship is in port may be vulnerable to biofouling accumulation, and should be closely monitored. If seawater cooling systems become fouled, they should be appropriately treated. Any discharge of treated water from internal seawater cooling systems should be undertaken in accordance with applicable regulations.

8 DESIGN AND CONSTRUCTION

8.1 Initial ship design and construction offers the most comprehensive, effective and durable means by which to minimize ship biofouling risks. In the design and construction of a ship, or when a ship is being significantly altered, the following should be taken into consideration.

.1 Small niches and sheltered areas should be excluded from the ship as far as practical, e.g., flush mounting pipes in sea chests. Where not practical, these should be designed so that they may be easily accessed for inspection, cleaning and application of anti-fouling measures.

.2 Rounding and/or bevelling of corners, gratings and protrusions to promote more effective coverage of anti-fouling coating systems, and hinging of gratings to enable diver access.

.3 Providing the capacity to blank off the sea chest and other areas, such as moon pools, floodable docks and other free flood spaces, for treatment and/or cleaning.

8.2 Internal seawater cooling systems should be designed and made of appropriate material to minimize biofouling and constructed with a minimum of bends, kinks and flanges in seawater piping.

8.3 To avoid creation of avoidable niches while ensuring effective safety and operation of the ship, where practical, particular attention should be given to avoidance of unfilled gaps in all skin fittings and the detailed design of the items as follows:

.1 sea chests – minimize size and number, and use smooth surfaces to maximize flow efficiency, fit MGPS, and steam or hot water cleaning systems, grills and their opening arrangements designed for in-water inspection and maintenance;

.2 retractable fittings and equipment – avoid external reinforcement (such as stiffeners) where possible, design for in-water inspection and maintenance;

.3 tunnel thrusters – tunnels to be above light water line or accessible to divers, grills and their opening arrangements designed for in-water inspection, maintenance and operation;

.4 sponsons and hull blisters – use fully enclosed in preference to free flooding types, with access provisions made for in-water inspection, cleaning and maintenance;

.5 stern tube seal assemblies and rope guards – design for in-water inspection, cleaning and maintenance; and

.6 immersible and seabed equipment – ensure facilities for equipment washdown during retrieval and enclosed washdown areas for cleaning of equipment onboard, if necessary, are provided.

9 DISSEMINATION OF INFORMATION

9.1 States are encouraged to maintain and exchange information relevant to these Guidelines through the Organization. Accordingly, States are encouraged to provide the Organization with the information related to the management of biofouling as follows:

.1 copies of current regional, national and local laws, regulations, standards, exemptions or guidelines;

.2 technical and research information, including any studies on the impact and control of invasive aquatic species in ships' biofouling, and on the efficacy and practicality of environmentally protective in-water cleaning technologies;

.3 education materials such as CD's, DVD's or printed materials; and

.4 the location of and the terms of use for cleaning and maintenance services and facilities for ships and equipment that comply with these Guidelines.

9.2 State authorities should provide ships with timely, clear and concise information on biofouling management measures and treatment requirements that are being applied to shipping and ensure these are widely distributed. Shipowners and operators should endeavour to become familiar with all requirements related to biofouling by requesting such information from their port or shipping agents or competent authorities (i.e. State authorities). State authorities should also provide ships with any available information on particular invasive aquatic species that may be present in a port and could attach to a ship as biofouling (e.g., if a particular species of concern is spawning) in a timely manner.

9.3 Organizations or shipping agents representing shipowners and operators should be familiar with the requirements of State authorities with respect to biofouling management and treatment procedures, including information that will be needed to obtain entry clearance. Verification and detailed information concerning State requirements should be obtained by the ship prior to arrival.

9.4 To monitor the effectiveness of these Guidelines, States, as part of the evaluation process could provide to the Organization details of records describing reasons why ships could not apply these Guidelines, e.g., design, construction or operation of a ship, particularly from the view point of ships' safety, or lack of information concerning the Guidelines.

10 TRAINING AND EDUCATION

10.1 Training for ships' masters and crews, in-water cleaning or maintenance facility operators and those surveying or inspecting ships as appropriate should include instructions on the application of biofouling management and treatment procedures, based upon the information contained in these Guidelines. Instruction should also be provided on the following:

.1 maintenance of appropriate records and logs;

.2 impacts of invasive aquatic species from ships' biofouling;

.3 benefits to the ship of managing biofouling and the threats posed by not applying management procedures;

.4 biofouling management measures and associated safety procedures; and

.5 relevant health and safety issues.

10.2 States and industry organizations should ensure that relevant marine training organizations are aware of these Guidelines and include this in their syllabuses as appropriate.

11 OTHER MEASURES

11.1 To the extent practical, States and port authorities should aim to ensure smooth flow of ships going in and out of their ports to avoid keeping ships waiting offshore so that anti-fouling systems can operate as effectively as possible.

11.2 States may apply other measures on ships within their jurisdiction for the purpose of providing additional protection for their marine environment, or in emergency situations. In managing emergency situations for biofouling, States should consider the guidance document for ballast water emergency situations (BWM.2/Circ.17).

11.3 States should take into account these Guidelines when developing other measures and/or restrictions for managing ships' biofouling.

11.4 Where other measures are being applied, States should notify the Organization of the specific requirements, with supporting documentation, for dissemination to other States and non-governmental agencies where appropriate.

11.5 The application of other measures by States should not place the safety of the ship and crew at risk.

12 FUTURE WORK

Research needs

12.1 States and other interested parties should encourage and support research into, and development of technologies for:

.1 minimizing and/or managing both macrofouling and microfouling particularly in niche areas (e.g., new or different anti-fouling systems and different designs for niche areas to minimize biofouling);

.2 in-water cleaning that ensures effective management of the anti-fouling system, biofouling and other contaminants, including effective capture of biological material;

.3 comprehensive methods for assessing the risks associated with in-water cleaning;

.4 shipboard monitoring and detection of biofouling;

.5 reducing the macrofouling risk posed by the dry-docking support strips, (e.g., alternative keel block designs that leave less uncoated hull area);

.6 the geographic distribution of biofouling invasive aquatic species; and

.7 the rapid response to invasive aquatic species incursions, including diagnostic tools and eradication methods.

12.2 Potential operational benefits of such technologies should also be highlighted and relevant information provided to the Organization.

Independent information needs

12.3 Summaries are needed of the different types of anti-fouling systems and other biofouling management measures currently available, how they work and their performance under different operating conditions and situations. This information could assist shipowners and operators when making decisions about the most appropriate coatings and coating systems for their ship type and activity.

* * *

APPENDIX 1

BIOFOULING MANAGEMENT PLAN AND RECORD BOOK

Format and content of Biofouling Management Plan

The following information should be considered when developing a Biofouling Management Plan (the Plan). It is important that the Plan be specific to each ship.

The Plan may be a stand-alone document or integrated in part or full in the ships' operational and procedures manuals and/or planned maintenance systems.

INTRODUCTION

This section should contain a brief introduction for the ship's crew, explaining the need for biofouling management, and the importance of accurate record keeping.

The Plan should state that it is to be available for viewing on request by a port State authority and should be written in the working language of the crew.

SHIP PARTICULARS

At least the following details should be included:

- Ship's name.
- Flag.
- Port of registry.
- Gross tonnage.
- Registration number (i.e. IMO number and/or other registration numbers, if applicable).
- Regulation Length.
- Beam.
- Ship type (as classified by Lloyds Register – see Table 1).
- International call sign and Maritime Mobile Service Identity (MMSI).

Table 1: Ship types, as classified by Lloyd's Register

anchor handling fire fighting tug/supply	dredger	lighthouse/tender	roll on roll off
anchor handling tug	drill platform	Liquid Natural Gas Carrier	salvage tug
anchor handling tug/supply	drill ship	Liquid Petroleum Gas Carrier	seismographic research
asphalt tanker	ferry	livestock	semi-sub heavy lift vessel
barge	fire fighting tug	meteorological research	suction dredger
bulk carrier	fire fighting tug/supply	naval auxiliary tanker	supply
bulk carrier with container capacity	fish carrier	naval vessel	support
bulk cement carrier	fish factory	oceanographic research	tank barge
bulk ore carrier	fishery protection	offshore safety	tanker (unspecified)
bunkering tanker	fishing (general)	passenger (cruise)	trailing suction hopper dredger
cable ship	floating gas production	passenger roll on roll off	training
chemical tanker	floating production tanker	patrol ship	trawler (all types)
combined bulk and oil carrier	floating storage tanker	pipe layer	tug
combined chemical and oil tanker	fully cellular containership	pollution control vessel	tug/supply
combined LNG and LPG Gas Carrier	general cargo	pontoon	vehicle carrier
combined ore and oil carrier	general cargo with container capacity	product tanker	whaler
crane barge	grab dredger	pusher tug	wood-chip carrier
crane ship	hopper barge	reefer	yacht
crude oil tanker	hopper dredger	research	
cutter suction dredger	icebreaker	research/supply ship	
diving support	landing craft	roll on roll off with container capacity	

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A table of contents should be included.

PURPOSE

The purpose of the Plan is to outline measures for the control and management of ships' biofouling in accordance with the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (the Guidelines). It provides operational guidance for the planning and actions required for ships' biofouling management.

DESCRIPTION OF THE ANTI-FOULING SYSTEMS

The Plan should describe the anti-fouling systems in place for different parts of the ship, including as follows:

- type(s) of anti-fouling coating systems applied;
- details of where anti-fouling systems are and are not applied or installed;
- manufacturer and product names of all coatings or products used in the anti-fouling coating systems; and
- anti-fouling system specifications (including dry film thickness for coatings, dosing and frequency for MGPSs, etc.) together with the expected effective life, operating conditions required for coatings to be effective, cleaning requirements and any other specifications relevant for paint performance.

Previous reports on the performance of the ship's anti-fouling systems should be included, if applicable, and the AFS certificate or statement of compliance or other documentation should also be referenced, as appropriate.

DESCRIPTION OF OPERATING PROFILE

The Plan should describe the ship's operating profile that has determined the performance specifications of the ship's anti-fouling systems and operational practices, including:

- typical operating speeds;
- periods underway at sea compared with periods berthed, anchored or moored;
- typical operating areas or trading routes; and
- planned duration between dry-dockings/slippings.

DESCRIPTION OF AREAS ON THE SHIP SUSCEPTIBLE TO BIOFOULING

The Plan should identify the hull areas, niche areas and seawater cooling systems on the ship that are particularly susceptible to biofouling and describe the management actions required for each area. It should also describe the actions to be taken if the ship is operating outside of the desired operating profile, or if excessive unexpected biofouling is observed, and any other actions that can be taken to minimize the accumulation of biofouling on the ship. Table 1 provides an example of an action plan.

Table 2: Biofouling management action plan

Areas of the ship which are particularly susceptible to biofouling	**Management actions required for each area** (e.g., inspections, cleaning, repairs and maintenance)	**Management actions to be undertaken if ship operates outside its usual operating profile**
External hull surfaces: - Vertical sides - Flats - Boottop - Bow dome - Transom		
Hull appendages and fittings: - Bilge keels - A-brackets - Stabilizer fins - CP anodes		

Steering and propulsion:
 	
- Propeller
- Propeller shaft
- Stern tube seal
- Anchor chain
- Chain locker
- Rope guard
- Rudder
- Bow/Stern thrusters
  - Propeller
  - Thruster body
  - Tunnel
- Tunnel grates		

Seawater intakes and internal seawater cooling systems: - Engine cooling system - Sea chests (identify number and position) - Sea chest grate - Internal pipework and heat exchanger - Fire fighting system - Ballast uptake system - Auxiliary services system		

A diagram of the ship should be included in the Plan to identify the location of those areas of the ship that are particularly susceptible to biofouling (including access points in the internal seawater cooling systems). If necessary these should show both side and bottom views of the ship.

OPERATION AND MAINTENANCE OF THE ANTI-FOULING SYSTEM

This section should contain a detailed description of the operation and maintenance of the anti-fouling system(s) used, including schedule(s) of activities and step-by-step operational procedures.

Timing of operational and maintenance activities

This section should stipulate the schedule of planned inspections, repairs, maintenance and renewal of the anti-fouling systems.

In-water cleaning and maintenance procedures

This section should set out planned maintenance procedures (other than for on board treatment processes) that need to be completed between dry-docking events to minimize biofouling. This should include routine cleaning or other treatments. Details should be provided on the treatment/cleaning to be conducted, the specification of any equipment required, details of the areas to which each specific treatment/cleaning is to be applied, step-by-step operational procedures where relevant and any other details relevant to the processes (e.g., chemicals required for treatment, any discharge standards).

Operation of onboard treatment processes

This section should provide specific advice about MGPS fitted, internal seawater cooling systems covered by the system and any not covered, and the associated maintenance and inspection schedule and procedures. This would include information such as when each MGPS is run, for how long and any cleaning/maintenance requirements of the system once use is finished. This section should also include advice for ship operators on procedures for biofouling management if the MGPS is temporarily out of operation.

SAFETY PROCEDURES FOR THE SHIP AND THE CREW

Details of specific operational or safety restrictions, including those associated with the management system that affects the ship and/or the crew.

Details of specific safety procedures to be followed during ship inspections.

DISPOSAL OF BIOLOGICAL WASTE

This section should contain procedures for the disposal of biological waste generated by treatment or cleaning processes when the cleaning is conducted by, or under the direct supervision of, the shipowner, master or crew.

RECORDING REQUIREMENTS

This section should contain details of the types of documentation to be kept to verify the operations and treatments to be recorded in the Biofouling Record Book as outlined in appendix 2.

CREW TRAINING AND FAMILIARIZATION

This section should contain information on the provision of crew training and familiarization.

* * *

APPENDIX 2

BIOFOULING MANAGEMENT PLAN AND RECORD BOOK

Biofouling Record Book Form

Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species

Period From: …… To: .....

Name of Ship .....

Registration number* .....

Gross tonnage .....

Flag .....

* Registration number = IMO number and /or other registration numbers.

The ship is provided with a Biofouling Management Plan ☐

Diagram of ship indicating underwater hull form (showing both side and bottom views of the ship, if necessary) and recognized biofouling niches:

1 Introduction

The Guidelines recommend that a Biofouling Record Book is maintained for each ship, in which should be recorded the details of all inspections and biofouling management measures undertaken on the ship.

2 Entries in the Biofouling Record Book

The following information should be recorded in the Biofouling Record Book:

2.1 After each dry-docking:

a. Date and location that the ship was dry-docked.

b. Date that ship was re-floated.

c. Any hull cleaning that was performed while dry-docked, including areas cleaned, method used for cleaning and the location of dry-dock support blocks.

d. Any anti-fouling coating system, including patch repairs, that was applied while dry-docked. Detail the type of anti-fouling coating system, the area and locations it was applied to, the coating thickness achieved and any surface preparation work undertaken (e.g., complete removal of underlying anti-fouling coating system or application of new anti-fouling coating system over the top of existing anti-fouling coating system).

e. Name, position and signature of the person in charge of the activity for the ship.

2.2 When the hull area, fittings, niches and voids below the waterline have been inspected by divers:

a. Date and location of ship when dive surveyed and reason for survey.

b. Area or side of the ship surveyed.

c. General observations with regard to biofouling (i.e. extent of biofouling and predominant biofouling types, e.g., mussels, barnacles, tubeworms, algae and slime).

d. What action was taken, if any, to remove or otherwise treat biofouling.

e. Any supporting evidence of the actions taken (e.g., report from the classification society or contractor, photographs and receipts).

f. Name, position, signature of the person in charge of the activity.

2.3 When the hull area, fittings, niches and voids below the waterline have been cleaned by divers:

a. Date and location of ship when cleaning/treatment occurred.

b. Hull areas, fittings, niches and voids cleaned/treated.

c. Methods of cleaning or treatment used.

d. General observations with regard to biofouling (i.e. extent of biofouling and predominant biofouling types, e.g., mussels, barnacles, tubeworms, algae and slime).

e. Any supporting evidence of the actions taken (e.g., report from the classification society or contractor, photographs and receipts).

f. Records of permits required to undertake in-water cleaning if applicable.

g. Name, position and signature of the person in charge of the activity.

2.4 When the internal seawater cooling systems have been inspected and cleaned or treated:

a. Date and location of ship when inspection and/or cleaning occurred.

b. General observations with regard to biofouling of internal seawater cooling systems (i.e. extent of biofouling and predominant biofouling types, e.g., mussels, barnacles, tubeworms, algae, slime).

c. Any cleaning or treatment undertaken.

d. Methods of cleaning or treatment used.

e. Any supporting evidence of the actions taken (e.g., report from the classification society or contractor, photographs and receipts.

f. Name, position and signature of the person in charge of the activity.

2.5 For ships with a MGPS fitted:

a. Records of operation and maintenance (such as regularly monitoring the electrical and mechanical functions of the systems).

b. Any instances when the system was not operating in accordance with the biofouling management plan.

2.6 Periods of time when the ship was laid up/inactive for an extended period of time:

a. Date and location where ship was laid up.

b. Date when ship returned to normal operations.

c. Maintenance action taken prior to and following the period laid up.

d. Precautions taken to prevent biofouling accumulation (e.g., sea chests blanked off).

2.7 Periods of time when ship operating outside its normal operating profile:

a. Duration and dates when ship not operating in accordance with its normal operating profile.

b. Reason for departure from normal operating profile (e.g., unexpected maintenance required).

2.8 Details of official inspection or review of ship biofouling risk (for ships arriving internationally, if applicable):

a. Date and location of ship when inspection or review occurred.

b. Port State authority conducting the inspection/review and details of procedures followed or protocol adhered to and inspector/s involved.

c. Result of inspection/review.

d. Name, position, signature of the person in charge of the activity for the ship.

2.9 Any additional observations and general remarks:

a. Since the ship was last cleaned, has the ship spent periods of time in locations that may significantly affect biofouling accumulation (e.g., fresh water, high latitude (Arctic and Antarctic) or tropical ports).

Record of Biofouling Management Actions

SAMPLE BIOFOULING RECORD BOOK PAGE

Name of Ship: .....

Registration number: .....

Date	Item (number)	Record of management actions	Signature of officers in charge

Signature of master ……..……

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ANNEX 2

DRAFT PROCEDURE FOR APPROVING OTHER METHODS OF BALLAST WATER MANAGEMENT IN ACCORDANCE WITH REGULATION B-3.7 OF THE BWM CONVENTION

1 INTRODUCTION

1.1 Regulation B-3.7 of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the BWM Convention) permits the use of Other Methods of ballast water management to achieve at least the same level of protection to the environment, human health, property or resources as described in regulations B-3.1 to B-3.5, and approved in principle by the MEPC.

1.2 Those developing Other Methods should also take into account: safety considerations relating to the ship and the crew; environmental acceptability (i.e. not causing greater environmental impacts than they solve); practicality (i.e. compatibility with ship design and operations); cost-effectiveness and economics; and biological effectiveness.

1.3 The Procedure for approving Other Methods of ballast water management in accordance with regulation B-3.7 of the BWM Convention (hereafter referred to as "the Procedure"), aims at providing criteria for the evaluation and approval of Other Methods of ballast water management (hereafter referred to as "Other Methods").

1.4 This Procedure has been developed to ensure that these Other Methods provide at least the same level of protection to the environment, human health, property or resources as those methods permitted under regulations B-3.1 to B-3.5.

1.5 Other Methods of ballast water management are to be approved in principle by the Committee prior to approval of an Other Method by the Administration.

1.6 Systems based on an Other Method where Active Substances and Preparations are added to the ballast water, or are generated on board ships by the system, should also be subject to the approval by the Committee in accordance with the Procedure for approval of ballast water management systems that make use of Active Substances (G9).

1.7 All shipboard systems based on an Other Method will also have to gain Type Approval or Prototype Approval, as appropriate, under the Guidelines for approval of ballast water management systems (G8), or Guidelines for approval of prototype ballast water treatment technologies (G10).

1.8 Where an Other Method cannot be type approved due to the nature of the method, the Administration should recommend to the Committee an appropriate method of recognition or certification.

1.9 The environmental impacts of any chemical by-products and/or physical effects formed by an Other Method will also have to be evaluated by the Administration during the approval process, with respect to safety to the environment.

1.10 The Procedure identifies the information to be provided, identifies the responsible parties for providing such information and outlines the approval processes required by the Committee.

1.11 The use of Other Methods of ballast water management should be consistent with the objectives of the Convention – "to prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments, as well as to avoid unwanted side effects from that control, and to encourage developments in related knowledge and technology". Depending on the new technology used in the Other Method, verifications for approval could be different from those specified in paragraph 1.7 but keep the same level of protection.

1.12 Other Methods using organisms are not within the scope of this Procedure.

2 PURPOSE

2.1 The Procedure aims to ensure that any Other Methods approved provide an equivalent level of protection to the standards contained in the BWM Convention. The Procedure will be kept under review and updated by the Committee in light of the experience gained during its application and as the state of knowledge and technology may require.

2.2 The purpose of the Procedure is to:

.1 provide a uniform interpretation and application of the requirements for the approval of Other Methods permitted under regulation B-3.7;

.2 ensure that Other Methods approved by an Administration are capable of at least achieving equivalence to the level of protection provided by the standards of the BWM Convention with respect to the prevention of the transfer of harmful aquatic organisms and pathogens as required by regulations B-3.1 to B-3.5;

.3 assist in determining the information necessary for the approval in principle of Other Methods under regulation B-3.7 of the BWM Convention and identify the roles and responsibilities in providing such information;

.4 assist Administrations in conducting the approval of an Other Method;

.5 provide guidance to manufacturers, shipowners and other interested parties involved in determining the suitability of an Other Method to meet the requirements of the BWM Convention; and

.6 provide the approval process used by the Committee.

3 DEFINITIONS

3.1 For the purposes of this Procedure, the definitions in the Convention apply and:

.1 **Method** means a process developed and designed to reduce the transfer of harmful aquatic organisms through ships' ballast water to meet the requirements specified under regulations B-3.1 to B-3.5 of the BWM Convention.

.2 **Other Method** means an alternative to a Method defined in paragraph 3.1.1 above, which provides a level of protection equivalent to the requirements specified in regulations B-3.1 to B-3.5 of the BWM Convention.

4 APPLICABILITY

4.1 The Procedure applies to all Administrations, Parties to the BWM Convention and other IMO Member States, seeking approval in principle for an Other Method under regulation B-3.7 or assessing or granting approval for such Other Methods. This Procedure is also for the use of the Committee when considering approval in principle.

4.2 Equipment manufacturers wanting to seek approval for an Other Method should also consult this Procedure.

4.3 Ballast water management methods subject to regulation A-4.1 of the BWM Convention are not subject to this procedure or to regulation B-3.7.

5 APPLICATION TO THE COMMITTEE FOR APPROVAL IN PRINCIPLE OF AN OTHER METHOD

5.1 The information provided to support the application for approval in principle should be complete, of sufficient quality and in accordance with this Procedure.

5.2 The applicant for approval in principle of an Other Method should provide independently validated and/or operational proof that the Other Method being submitted:

.1 provides a level of protection at least equivalent to that provided by the requirements specified in regulations B-3.1 to B-3.5 of the BWM Convention; and

.2 is capable of providing a consistent level of protection at all times in all environments/locations.

Equivalence and benchmark criteria for an application for approval in principle of an Other Method

5.3 Applications for Other Methods should contain a fully developed independently validated approach for assessing the level of protection provided by that Other Method against the transfer of harmful aquatic organisms and pathogens and its equivalence to the requirements in regulations B-3.1 to B-3.5 of the BWM Convention and the additional requirements outlined in this Procedure, as appropriate. A possible starting point for such an approach could be a comparison of the level of protection ensured by ballast water management in compliance with regulations B-3.1 to B-3.5 and the level of protection ensured by the Other Method if used on comparable ships.

5.4 Other Methods should demonstrate by risk assessment, independently validated physical and biological modelling, operational testing of this modelling and full-scale operational testing, where applicable, that the Other Method is capable of meeting at all times a level of protection that is at least equivalent to the level of protection with respect to the prevention of the transfer of harmful aquatic organisms and pathogens via discharge of ballast water compared to existing requirements. The risk assessment should be at least to the same level of rigour as stipulated in Guidelines (G7).

5.5 Applications for Other Methods should specify the benchmark against which the performance of any systems based on that particular Other Method can be measured. The benchmark would:

.1 enable a transparent comparison by the Committee of the level of protection provided by the Other Method with that provided by the requirements in regulations B-3.1 to B-3.5 of the BWM Convention;

.2 be measurable and able to be evaluated for approval (similar to the requirements of the Convention, i.e. D-1 being a process evaluation, while D-2 is a measurable performance standard);

.3 be verifiable by Port and Flag States through sampling, records or other processes (to be properly defined, listed and technically explained/clarified, in the pertinent application, in terms of proposed verifications for Flag State or port State control inspections to be carried out on board);

.4 need to be contained in the application, agreed by the Committee and then be used for consideration of approval through compliance testing by Port State Control;

.5 provide an assurance that systems based on an Other Method are providing the same level of protection for the environment as the Other Method that has received the approval in principle from the Committee; and

.6 be based on a recognized international standard, where appropriate, so long as they can be proved as equivalent to the existing requirements.

5.6 An Other Method may provide the same level of protection for the environment, human health, property or resources where:

.1 the ballasting and de-ballasting process does not transfer harmful aquatic organisms and pathogens; or

.2 the ballast water discharge contains no harmful aquatic organisms and pathogens.

Sampling protocol criteria for an application for approval in principle of an Other Method

5.7 The application for an Other Method should contain a ballast water sampling and analysis protocol that should be consistent with the Guidelines for ballast water sampling (G2).

Ship and personnel safety criteria for an application for approval in principle of an Other Method

5.8 The application should include a Formal Safety Assessment or a Safety Case to ensure that the Other Method or system based on an Other Method is safe for installation on board ship and any risks to the ship's crew resulting from the system are identified and adequately addressed. This Formal Safety Assessment or Safety Case should be consistent with part 3 of the annex to the Guidelines for approval of ballast water management systems (G8) and approved by the Administration.

6 SUBMISSION PROCESS

6.1 The applicant should evaluate the Other Method against the benchmark according to a protocol that is approved by an Administration.

6.2 The applicant should then prepare an application for the Other Method and submit it to the Member State concerned.

6.3 The Administration should review the application to ensure it is satisfactory (i.e. contains all of the information that is required and the information provided is of a sufficient standard to enable a decision to be made by the Committee). If the application is satisfactory, the Member should submit a proposal for approval in principle to the Committee taking into account the deadlines prior to the MEPC at which approval in principle is to be sought.

6.4 When in session, the Committee should decide if the proposal is acceptable for consideration by the Committee and set the time frame for the evaluation of the proposal as follows:

.1 the Committee may commission an independent review of the risk assessment method, data and assumptions in order to ensure that a scientifically rigorous analysis has been conducted. The review should be undertaken by independent experts with ecological, aquatic biology, ship design and operation, and risk assessment expertise; and

.2 the reviewers' report should be in written form and circulated to the Parties, Members of the Organization, the United Nations and its Specialized Agencies, intergovernmental organizations having agreements with the Organization and non-governmental organizations in consultative status with the Organization, prior to its consideration by the Committee.

6.5 All proprietary data should be treated as confidential by the Committee, the competent authorities involved, and the independent reviewers, if any. However, all information related to safety and environmental protection, including physical/chemical properties and data on environmental fate and toxicity, should be treated as non-confidential.

6.6 The Committee should evaluate the application for approval in principle of an Other Method in accordance with this Procedure.

7 ASSESSMENT OF EQUIVALENCE

7.1 The Committee should review the benchmarks detailed in the application and, as appropriate, take them into account when assessing equivalence to the level of protection for the environment, human health, property or resources as provided for in regulations B-3.1 to B-3.5.

7.2 Other Methods designed to provide at least an equivalent level of protection with respect to the prevention of the transfer of harmful aquatic organisms and pathogens via discharge of ballast water should demonstrate by risk assessment, independently validated physical and biological modelling, operational testing of this modelling and full-scale operational testing, where applicable, that the Other Method is capable of meeting a level of protection at all times that is, at least equivalent to, or better than, the applicable requirements contained in the BWM Convention.

7.3 Risk assessment is the logical process for assigning the likelihood and consequences of specific events, such as entry, establishment or spread of harmful aquatic organisms and pathogens in situations where a direct comparison of application benchmarks with the D-1 and D-2 standards is not possible.

7.4 In undertaking risk assessment to consider and evaluate the equivalence of an Other Method with the existing standards, the risk assessment principles outlined in the Guidelines for risk assessment under regulation A-4 of the BWM Convention (G7) should be carefully applied. The lack of full scientific certainty should be carefully considered in the decision making process.

Equivalence with the D-1 standard

7.5 Other Methods designed to provide equivalence to the D-1 standard can be used only until the ship type, under the BWM Convention, is required to comply with the D-2 standard (unless the system proves it can also provide equivalence to the D-2 standard):

.1 these methods should demonstrate through risk assessment, independently validated physical and biological modelling, operational testing of this modelling and full-scale operational testing of systems based on Other Methods, where applicable, that the Other Method is capable of meeting at all times a level of protection that is, at least equivalent to, or better than, regulation D-1 of the BWM Convention;

.2 if there is a question about the environmental impact of an Other Method during its development, such approval should be split in the same way as it is in Procedure (G9). That is, Other Methods should be approved by the Administration and Committee based on independently validated data prior to being tested at sea; and

.3 the relevant water quality parameters (e.g., suspended solids, salinity, oxygen concentration, particulate organic matter) should be reasonably the same in the incoming as well as in the outflowing water.

Equivalence with the D-2 standard

7.6 Other Methods designed to provide equivalence to the D-2 standard should demonstrate through risk assessment, independently validated physical and biological modelling, operational testing of this modelling and full-scale operational testing of systems based on Other Methods, where applicable, that the Other Method is capable of meeting at all times a level of protection that is at least equivalent to, or better than, regulation D-2 of the BWM Convention, as follows:

.1 where appropriate, benchmarks should be based on recognized international standards as long as they can be proven to provide an equivalent level of protection to the D-2 standard;

.2 the description of the main characteristics of the ballast water as well as the absence/presence of harmful aquatic organisms is to be supported by independent verification; and

.3 onboard test results, equipment specification and quality assurance should be available.

8 APPROVAL

8.1 The approval takes place in two steps:

.1 an approval in principle of the Other Method following review and evaluation by the Committee (regulation B-3.7); and

.2 an approval of the Other Method in a manner analogous to Guidelines (G8) and (G10), by the Administration.

Assessment for approval in principle

8.2 The application for approval in principle should be assessed by the Committee to ascertain whether:

.1 the application for approval in principle is complete, of sufficient quality, and in accordance with this Procedure;

.2 the Other Method does not cause any unacceptable adverse effects to environment, human health, property or resources;

.3 the Other Method does not contravene other regulations in the BWM Convention, or any other convention or code applicable to the ship type;

.4 the Other Method ensures at least the same level of protection to the environment, human health, property or resources as those methods permitted under regulations B-3.1 to B-3.5; and

.5 the Procedure for approval set out by the Administration is appropriate.

8.3 The application should not be granted approval in principle when there is absence of information or significant uncertainty.

8.4 The Committee should decide whether to approve in principle the proposal, introduce any modifications thereto, if appropriate, taking into account the reviewers' report.

8.5 The Administration that submitted the application to the Committee should inform in writing the applicant about the decision made with regard to the Other Method.

Approval by the Administration

8.6 An Other Method, having received approval in principle from the Committee, is to be approved by an Administration.

8.7 A shipboard system may need to be assessed for Type Approval.

8.8 The Administration should evaluate an Other Method for safety to the environment, human health, property, or resources.

9 NOTIFICATION OF APPROVAL

9.1 The Committee will record the approval in principle of Other Methods and circulate the list once a year including the following information:

- the document reference of the approval in principle of the Other Method by the Committee;
- name and brief description of the Other Method;
- name of ballast water management system that makes use of the Other Method if appropriate;
- date of approval;

- name of applicant;

- the benchmark that the Other Method is designed to meet, and the methods of assessing compliance to this benchmark;

- copies of or access routes to test reports, test methods, etc. (as resolution MEPC.175 (58)); and

- any other specifications, if necessary.

9.2 Administrations, when approving an Other Method should report to the Committee in a manner consistent with resolution MEPC.175(58) "Information reporting on Type Approved ballast water management systems".

10 MODIFICATION

10.1 The holder of an Other Method approval should report any modifications to the Administration.

10.2 Any modifications to an approved Other Method should be re-evaluated in accordance with this Procedure.

11 WITHDRAWAL OF APPROVAL

11.1 The Committee may withdraw any approval in principle in the following circumstances:

.1 if the Other Method or system based on an Other Method no longer conforms to requirements due to amendments of the BWM Convention;

.2 if any data or test records differ materially from data relied upon at the time of approval and are deemed not to satisfy the approval criteria;

.3 if a request for withdrawal of approval is made by the Administration on behalf of the holder of an Other Method approval; and

.4 if unreasonable harm to environment, human health, property or resources is determined to have been caused by an approved Other Method.

11.2 The decision to withdraw an approval in principle should specify all necessary further details, including the date upon which the withdrawal takes effect.

12 USE ON SHIPS

12.1 Ships using an Other Method under regulation B-3.7 of the BWM Convention, to meet their obligations under this Convention, can only do so once the Other Method has been approved in principle by the Committee and has been approved by an Administration.

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ANNEX 3

GUIDANCE DOCUMENT ON SCALING OF BALLAST WATER MANAGEMENT SYSTEMS

1 Reference in the Guidelines (G8)

1.1 In addition to the definitions given in the Guidelines (G8), the following terms are defined:

.1 *Base unit* is a ballast water treatment equipment as defined in the Guidelines (G8).

.2 *Scaled unit* is the ballast water treatment equipment that is based on the base unit but has been modified to accommodate a higher or lower treatment rated capacity (TRC).

1.2 An equipment review and certification of a scaled system should be undertaken by the Administration. Such a review should be supported by:

.1 Mathematical modelling and/or calculations demonstrating that any parameters that would affect system performance are equivalent between base and scaled units; and

.2 The results of the environmental tests specified in Part 3 of the Annex to Guidelines (G8), for each configuration of scaled units, should such tests be required by the Administration.

1.3 The assumptions made for the scaling of the base unit should be verified for each scaled unit (i.e. discrete models, e.g., 250 m^3/h, 500 m^3/h, 1,000 m^3/h) by testing to the requirements of Part 2 of the Annex to the Guidelines (G8) for shipboard tests (hereafter referred to as shipboard tests). The time required in paragraph 2.2.2.7 of the Guidelines (G8) may be reduced from 6 to 3 months.

1.4 The same consideration should be given for scaled systems (i.e. discrete models, e.g., TRC=250 m^3/h, 500 m^3/h, 1,000 m^3/h) that are tested according to the requirements for land-based tests.

1.5 In the case where all discrete models are tested according to the requirements for land-based tests, the most vulnerable model should be tested according to the requirements for shipboard tests, to demonstrate the ability of the model to operate in normal ships' conditions.

1.6 Combinations of base units and scaled units which have been verified in their performance according to paragraphs 1.2 to 1.5 should be regarded as multiple units mounted in parallel and do not fall within the scope of this document.

1.7 Failing to meet the provisions of 1.2 to 1.5, each scaled system should be tested according to the requirements for land-based tests and shipboard tests.

1.8 If scaling and shipboard testing is intended to be utilized to type approve a system beyond its currently approved TRC without land-based testing then the following process applies:

.1 The documentation specified in paragraph 1.5 should identify the key internal and external performance parameters (e.g., dosage concentration, UV intensity, filter flux density, etc.) required to achieve the system's efficacy, and also specify the physical/environmental conditions and design parameters that affect these.

.2 Validated mathematical model and/or calculations should be used to predict that the key performance parameters will be achieved in the scaled unit design and that the fundamental mechanism of operation is not changed.

.3 It should be verified through shipboard testing that the scaled unit achieves the critical values of the key performance parameters utilizing the design determined by the model and or calculations identified in subparagraph 1.8.2.

.4 Modelling should address the efficacy and environmental impact of the system. The actual chemical analysis for by-products should be performed during shipboard testing, if necessary.

1.9 A representative number of scaled systems capacities, taking into account the treatment technology, should be tested according to the requirements for shipboard tests.

2 Reference in the Procedure (G9)

2.1 When scaling from systems that have received Basic and Final Approval from the Committee according to the Procedure (G9), the manufacturer and the Administration should ensure that any conditions on Final Approval of the base unit are still met for the scaled system or systems.

3 Issuing of Type Approval for systems using scaled units

3.1 The Type Approval Certificate issued by the Administration should include each and every scaled system if the scaling is done according to these procedures.

4 Application to existing Type Approvals involving scaled units

4.1 Administrations are encouraged to apply these guidelines to systems having received Type Approval involving scaled units prior to the adoption of these guidelines to the greatest extent possible.

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ANNEX 4

DRAFT TERMS OF REFERENCE FOR THE BALLAST WATER AND BIOFOULING WORKING GROUP TO BE ESTABLISHED AT BLG 16

The Ballast Water and Biofouling Working Group is instructed to:

.1 finalize the IMO circular to provide ballast water sampling and analysis protocols and to give advice on the uniform application of these protocols;

.2 consider document BLG 15/5/7 (Canada);

.3 finalize the guidance document providing advice relevant to owners and/or operators of recreational craft less than 24 metres in length, using annex 3 to document BLG 15/9 as a basis;

.4 finalize the draft time frame, criteria and process for evaluating the effectiveness of the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species, using annex 5 to document BLG 15/9 as a base document;

.5 consider the need for a guidance document on disposal of biofouling waste and advise the Sub-Committee accordingly; and

.6 provide a written report to BLG 16.